ADVANCED LIGHT SOURCE DIVISION

PY-2006 SELF-ASSESSMENT REPORT

July 27, 2006

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I. Executive Summary

The ALS' overall environment, safety and health (ES&H) goal is to conduct all operations in a manner that protects the health and safety of employees and the public and does not endanger the environment, as defined by ES&H policies and requirements in the Regulations and Procedures Manual (RPM), PUB-3000, the Integrated ES&H Management Plan (ISMS), and the Operating and Assurance Plan (OAP). FY2006 ALS operations continued to include particle accelerators, beamlines, lasers, chemical laboratories, machine shops, fabrication areas, warehouse space, and offices.

This was a singular year for safety at the ALS. As a result of deficiencies in the radiation safety program, a very thorough analysis of safety was conducted. The ensuing evaluation and corrective actions went well beyond radiation safety and touched all parts of the ALS organization. During this process, it became clear that the overall organizational infrastructure has been level or even reduced (as in FY06) while the user base has grown significantly over the last several years, and that this has had a large impact on the organization's safety capabilities. Also, the organizational structure needed to change to accommodate this growth and to clarify safety accountability and line management responsibility. Other issues included the division's relationship with the EHS Division, strengthening of its corrective action process, and more formalization in some of its processes.

ALS staff and management committed a large amount of time and energy to the improvement process and as a result many improvements have been implemented and there is a strong commitment to complete many more.

Some of the more far-reaching initiatives are:

- Establishment of the ALS Staff Safety Committee (SSC) which reports to the Director and has broad authority to investigate safety issues and make recommendations for improvements.
- Reorganization of the division to provide for a more direct accountability for line management of safety.
- Reorganization of the safety mgt. function in the ALS.
- Staffing changes to refill positions lost to RIFs and to add resource in key areas.

In summary, this has been a very challenging year for the ALS. It has faced these challenges directly and openly and, has made many important improvements to its safety program. As a result, it is well placed to meet its current and anticipated safety responsibilities.

II. Effectiveness of Division ES&H Program

This section is organized around the PY2006 Performance Criteria. In some cases, supplementary information is provided when related initiatives were undertaken as part of the radiation safety corrective actions. All supporting information is contained in appendices at the end of the main report.

V1. Communication.

1. *Are specific safety topics discussed at on-going meetings or monthly safety meetings. Is process systematic? Is information disseminated to staff.*
2. *Is a Division Safety Committee established, active, and communicating safety information?*
3. *Division ISM Plan has correct and adequate definition of EHS roles and responsibilities. Personnel are familiar with their assigned roles and responsibilities?*

The ALS ES&H Committee (leaders of all safety circles plus ALS management) meets every month. At the meeting, the members discuss safety issues and the lessons learned from them. Divisional ES&H managers pass on information about lab-wide ES&H/QA programs and problems which have arisen. All ALS employees belong to a safety circle that generally meets once a month to pass along safety issues and lessons learned from the ALS ES&H Committee meeting, and to provide every employee a forum for calling attention to safety issues. See the web-site at http://alsintra.lbl.gov/safety/index.html for a record of the minutes.

Additionally, the Staff Safety Committee (SSC) was commissioned to follow up on radiation safety issues. It provided a focused forum for staff and management to investigate, evaluate, and recommend solutions to on-going safety issues. It met over 35 times between January and July. Minutes were kept for each of these and are logged on an ALS e-room.

The ALS maintains a web-site (URL) with pertinent safety information; meeting minutes, presentations from All Hands and other safety meetings (RSC), as well as communications from the Director to staff in regards to safety. (See URL above)

The Director holds periodic All Hands meetings with safety as a standing agenda item. Recent meetings have devoted significant time to safety. See http://alsintra.lbl.gov/ for the links to these materials.

The ISM Plan has an important section on Accountability. It identifies overall responsibilities for a number of functions (Director, supervisors, PIs, individuals, etc.). It also addresses matrixed personnel explicitly (in some cases MOUs have been established to further identify responsibilities as well as contractors. This is also maintained on the ALS intranet at http://www-als.lbl.gov/als/safety/ism2005.pdf

On-going initiatives have been instituted in laser safety, electrical safety and industrial hygiene as well as radiation safety to better coordinate the ALS Division's EHS systems with EHS Division. These are part of a larger effort to build better links between the two divisions.

V2. Work Planning includes environmental reviews.

1. *Divisions demonstrate progress in waste minimization opportunities identified in PY05 self-assessement.*
2. *Divisions conduct reviews for new work*
3. *Divisions with no new work conduct an environmental review for at least one existing operations process.*

The ALS Division's planned initiative was to continue and further develop its resource conservation efforts from the previous year. Towards this end, the ALS has a battery recycling program that is still active and ALS is using recycled paper. The division has added to the annual self assessment checklist an item that the teams would be checking trash cans to look for any obvious non recycling. In those places where this is noted, division will make recycling opportunities more readily available.

In addition, the ALS implemented an important waste minimization opportunity this year. The inventory of gas cylinders was reduced significantly this year due to a combination of strategies. Part of this was just clearing out older, duplicative and/or empty cylinders. A more important component however, was to identify a set of potentially important gases that had not been used in a long time. For this year, the Chemical Dynamics group identified 37 such cylinders. Historically, these had been kept because of their expense and/or difficulty to produce. Many were unique gases that have since become unavailable or very difficult to procure. These were made available to the larger ALS research community and, of these, 6 were taken for reuse here at LBNL. For the remainder, the ALS User Services Group worked with the vendor, Airgas, to get them to accept these back for potential reuse. Another cylinder of cyanogen has been claimed by a researcher at Wayne State and we are in the process of developing the shipping protocol.

The EH&S benefit is two-fold. The ALS not only reduces its burden of toxic gases, but has made them available for reuse within the research community.

Further efforts are being planned for the upcoming year to implement this for rest of the other research groups that use gases and to develop a more effective clearinghouse at the ALS (sing the CMS database) for researchers to know about and use other group's gases so that they don't need to procure duplicative cylinders. Related to this, a cleanout of the chemicals in the User Services Lab, B10 room 102 is planned in conjunction with the planned demolition of B10 next year.

V3. Percentage of workspace inspected.

The ALS' self-assessment program, QUEST, is described in appendix V3. It should be noted that all ALS personnel, including those matrixed from other Berkeley Lab divisions, except short-term visitors and guests, are assigned to a self-assessment team. All ALS space is inspected against all applicable checklists at least once a year. These inspections have been completed for FY2006. The AFRD ES&H administrator is tracking resolutions of the corrective actions in LCATS/CATS on behalf of the ALS.

Further information about the QUEST process and some of the data are included in the appendix.

V4. For all Division projects, programs, and operations, have hazards and environmental impacts been identified, inventoried, and authorized? Does this inventory include both new work and modification of existing work? Is there documentation to show that appropriate levels of mgt. are involved?

Work at the ALS is reviewed in a tiered fashion. At the facility level, the ALS operates under an FSAD which has a comprehensive inventory of the radiological (bremsstrahlung and x-ray principally) hazards associated with a 1.9 GeV synchrotron light source. The FSAD is in revision now to prepare for the upcoming Top-off mode.
At the beam line level, each beam line undergoes a formal, documented analysis at the conceptual design, design review, and readiness review stages. Thereafter, annual reviews are performed.
Individual research work at a beam line undergoes an evaluation in the Experimental Safety Summary (ESS) process. Whenever there is a change to this, a Functional Change Form is processed to document.

Other work at the ALS is evaluated and documented using standard institutional means such as: laser and toxic gas work is authorized through AHDs; chemistry lab space is evaluated through the Chem Hygiene and Safety Plan (CHSP), research involving biological materials is evaluated by the BioSafety officer, etc.

V5. Are engineering controls monitored as part of division self-assessment program? Are line managers held accountable for assuring that controls are within the required schedule?

Yes. See the QUEST documentation from appendix V3 above for details. Examples include:

> Is there a daily inspection logbook? Is it being filled out whenever the crane/hoist is in use?
>
> Is there an LBNL Proof Load Tag on the hoist? Does the load limit on the tag match the marking on the hoist? Is the rated load of each hoist legibly marked and visible to the operator?
>
> Has the performance of local ventilation systems been checked within the past two years (signed and dated inspection sticker?
>
> Are high strength fasteners certified and controlled since purchase? Are certifications for installed high-strength fasteners available for review?
>
> Have eyewashes and safety showers been inspected within the last 3 months?

V6. Are hazards controlled for all division projects/activities? Are administrative controls reviewed annually and when work is modified? Are line managers held accountable for terminating or suspending operations when approvals are lacking, authorizations have expired, or training is not current?

See response to item V4 for ALS methodology on identification and control of hazards. Note that the ESS forms are reviewed annually also. The ALS has 9 AHDs, 7 current radiological authorizations, 7 SAA locations as well as some responsibilities for the site-wide BAAQMD solvent wipe permit. (See appendix V6 for the complete listing.) All have been reviewed/renewed at their appropriate frequency.

Yes. As evidence of this, there were several instances where line management stopped work upon learning of safety issues. For example, all three of the radiation interlock incidents were self identified and were accompanied by an immediate stop work.

V7. Division has an effective ergonomics program as evidenced by:
Employees report ergonomic pain or discomfort early and mgt. takes immediate action.
100% of required staff completes EHS052
100% of required staff completes EHS060
Ergonomic evaluations are conducted within 30 days of request (if no pain) or 2 days if pain reported.
Corrective actions completed within 30 days (with some exceptions)
Divisions focus safety communications on ergonomic awareness and ergonomic injury prevention.

Only one individual had this course as a requirement and it was mistaken. For EHS 060 the JHQ shows 83 out of 103. Ten of these were guests who are either no longer here or should not have had the requirement. Further, three of the staff with this requirement started within the last three months and should not be counted as lagging. The updated calculation for EHS 060 is, therefore, 92%. See appendix V7 for details and documentation.

V8. % of chemical owners OR % of locations are updated in the Chemical Management System.

ALS had 91% of its owners (11/12) perform an update in the CMS during the PY. See appendix V8

The initiative this year involved reduction of the gas cylinder inventory (see V2 for details). Also, plans have been initiated to improve the inventory of chemicals in the User Services Lab, B10 room 102. The drivers for this come from the divisional reorganization which will allow the User Services Group to better focus on this lab space and the planned demolition of the lab in FY07. Towards that end, staff have planned to update the entire inventory in that space when bar-code readers become available and then survey the research community for interest in retention. Those not claimed by researchers will be sent to waste or made available for reuse.

V9. % completion of OSHA instances from 2004 OSHA inspections.
ALS closed out all of its OSHA findings.

V10. Laser safety program is effective as evidenced by:
- Laser AHDs are current
- Laser users on campus meet all safety requirements
- All laser systems have been inspected annually
- Laser inventory database has been updated for all division lasers.

See appendix from V6 for a listing of all formal authorizations. All laser AHDs are current and have received their annual evaluations. ALS worked closely with the EHS Division laser safety staff to review

all of the laser installations in January, 2006 and fulfilled the Division Management Assurance requests regarding laser safety from EHS. EHS has, as of July 13, been out to the ALS and validated the laser inventories and safety systems.

As a result of the various inspections, ALS committed to and implemented several upgrades to its laser safety systems.

ALS is working with the new laser safety staff in EHS to develop a laser safety course that will be focused on users and be made available through the WWW. This will be coordinated with the electronic AHDs to make the overall process more effective and efficient. The current ALS User Advisory for laser safety is also under review by the new LSO and the ALS Laser user community.

ALS has no lasers on the UCB campus.

V11. Divisions have in place a control process to ensure continuity of accountability of hazardous materials during lab moves and for departing PIs.

A very serious issue for the ALS is to ensure continuity of accountability for the materials that users bring on-site. Chemicals have been stored centrally in the User Services Lab in B10-102. This has been the only practical way to ensure control and is fundamentally sound for this part of the ALS operation. However, implementation can be improved. For the past year, staff in the user services group have been very short-handed and so follow up has suffered. With the reorganization and staffing increases committed to in the Radiation Safety NTS corrective action plan, the ALS will be able to focus on this area and improve controls.

Control of biological materials on the floor is under very tight control and all used/excess biological materials are brought to the medical waste SAA in B10 room 104.

Control of hazardous materials in other parts of the ALS is under standard controls and when/if a custodian leaves, the CMS now automatically transfers ownership. An example of this is John Bozek who had his materials transferred to David Kilcoyne when he left the Lab.

V12. Does the Division have a program to control peroxide forming chemicals?

ALS strives to minimize its inventory of these chemicals.
Currently,

- Four containers of liquid Acetaldehyde are located in B10-102, but are owned by Chemical Sciences Division
- Four containers in that room are owned by ALS, but they are all in gas form and cannot be checked.
- One container of a peroxide-former is in B80, but is owned by Physical Biosciences.

See appendix V12 for details.

V13. Work within authorization.

% SAA compliance
% authorizations compliance (AHD, RWA, etc.)
# of environmental violations
% compliance QA waste sampling
 # Wste mgt. issued NCARs

% SAA compliance	75%	yellow
% authorizations compliance (AHD, RWA, etc.)	75%	yellow
# of environmental violations	0	green
% compliance QA waste sampling	92%	green
# Waste mgt. issued NCARs	0	green

* These data supplied by OCA and Waste Management. See appendix V13 for details.

This was a difficult year for the ALS in this expectation. As identified in the RSC subcommittee report, the ALS suffered from both management issues and staffing levels and this had a direct impact in this area. A rededication of management support, reorganization to better support line management accountability, and an increase in staffing were all identified and are in various stages of implementation to address this.

V14. Staff is properly trained.

JHQ completion was essentially 100%. Training completion was 94%. This has been a high visibility expectation for all ALS staff and it is directly measured and discussed in each individual's PRD. Management has consistently supported this and overall division performance has been excellent. See appendix V14 for details.

The division undertook an effort this year to translate all of its procedure training over to the same system. It has been working with ISS, EHS, and the JGI for the last two months and implementation of all of its procedure training is expected by end of September.

V15. Division ensures that student safety issues are effectively addressed.

Many users who come through the ALS are students. The Experimental Safety Summary (ESS) system described above was designed to be broad enough to adequately protect students. Beamline scientists ensure that all users receive proper on-the-job training for the limited tasks they perform while at the ALS.

V16. % completion of CATS/LCATS items.

The validated percentage is 76%. However, this does not give an accurate indication of the management attention to or the amount of effort expended on corrective actions by the ALS. As stated in the executive summary, much time and effort has gone in corrective actions associated with the radiation safety non-compliances. The SSC met a total of 37 times in the first six months of the Calendar Year and person-years of effort have been expended on evaluating and correcting systemic safety issues. Also, it should be noted that this effort involved all parts of the ALS staff who worked through some very difficult problems.

Appendix V16 has both the CATS/LCATS information and an overview of the radiation safety corrective actions.

A further impact on this measure was the change in Division Safety Coordinator in May, 2006. Time normally spent on correcting items was spent on understanding them, the system, and trying new ways of addressing them.

V17. Opportunities for improvement identified during the previous self assessment cycle are implemented in a timely manner.

Two issues were noted in the previous MESH Review. The first concerned over-crowding on the experimental floor and the second concerned maintenance of the many procedures that the ALS has. Addressing the first item is a very challenging problem. At the top level, the ALS believes that the recently funded Building 10 User Facility will help to mitigate this problem. At the working level, staff continue to sweep the floor biweekly (or more frequently) looking for excess materials and/or unsafe conditions.

For the second issue, the ALS is working with EHS and ISS to develop a system based on the EHS Training/JHQ databases which will allow it to centrally manage the training status of individuals and groups. The intent is to emulate the success we've had with JHQ training. This is scheduled for roll-out in September, 2006.

From the 2005 Self Assessment, the ALS continued with its initiatives in electrical safety and has had Dick Baker in half-time working on the Building 6 survey, implementation of policies and procedures to ensure compliance with NFPA 70E, and providing assistance to the various shops with their electrical safety issues.

Most importantly, from the RSC, the ALS has instituted corrective actions in the radiation safety area.

V18. Has Division ensured that accident causes and corrective actions are effectively identified?

For the performance year, the ALS had one first aid and one recordable injury. The recordable injury occurred in mid-June. Corrective actions were identified and implemented immediately. The Staff Safety Committee will perform an internal review to see if any further causes or corrective actions can be identified.

III. Summary of plans for PY07

Major, continuing effort will be focused on the completion of corrective actions from the Radiation Safety Committee. These include:

- hiring and reorganization committed to in the June, 2006 corrective action response
- implementation of an enhanced work planning model
- development and implementation of the "host" role for beamline scientists
- centralization and tracking of procedure training
- ISM training for supervisors

Other safety initiatives mentioned in the body of the report are also planned and are designed to integrate in with the larger radiation safety-driven initiatives. Of lab-wide interest is laser safety and this is also very important to the ALS. Upgrade of the AHD system should help the ALS to identify and document the different levels of users (full, partial, under supervision) and develop focused training for them. The ALS

is actively working with the EHS Division laser safety staff to develop this. The ALS laser user community is actively evaluating a number of other possible initiatives to improve both engineering and administrative controls.

Electrical safety continues to be a major issue for the ALS. Mapping of the below-grade conduits will continue as will ALS implementation of the lab-wide NFPA 70E requirements.

Demolition of B10 is scheduled for sometime in FY07 and so cleanout of the labs and shops will be a major effort. In particular, an inventory reduction effort will be undertaken for the user support lab prior to the demolition and Engineering Division staff and management are working with EHS and the Project to design a new and upgraded lead work shop in B80 to replace the current workspace in B10.

The ALS will work closely with EHS and the Lab in developing its institutional corrective actions to the January 2006 Peer Review, most particularly in the area of line management accountability as this is an important issue for a user facility with 2000+ users/year.